# SR-1 SIGMET RCP-8 Operator Guide

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## Startup

1. Unstow the antenna/pedestal system by removing the restraining rods.
2. Start the diesel generator and turn on the power breakers in the generator cabinet. Open the air compressor compartment next to the generator cabinet and turn the thumbwheel screw to the *right* (screw direction is reversed from normal) for a minute or so to allow some air to blow out to remove any condensed moisture from the compressor lines. When moisture stops dripping from the exhaust, close the thumbwheel screw. Do not over-tighten the screw.
3. Start the diesel generator and turn on the power breakers in the generator cabinet. Open the air compressor compartment next to the generator cabinet and turn the thumbwheel screw to the *right* (screw direction is reversed from normal) for a minute or so to allow some air to blow out to remove any condensed moisture from the compressor lines. When moisture stops dripping from the exhaust, close the thumbwheel screw. Do not over-tighten the screw.
4. Turn on breakers behind the operator seat in the cab rear. Breakers should point toward the middle of the unit and toward each other. *Don't move the lower breakers, those control the ground power option.*
5. Turn on the UPS (underneath the table) by pressing the (upper) big round button. Turn on the antenna control interface, RVP-8 unit, and transmitter. This should start the SIGMET computer boot process. Antenna control switch on the left side stays in "Remote" position.
6. Turn on the Navigator *Windows*© computer with the rocker switch labeled "0/1" underneath the SIGMET monitor.
7. Turn on the SIGMET monitor.
8. After the computer boots log in with '**operator**' and password '**xxxxxx**' `(6 lower case x's).`
9. Check to insure that the time is correctly set to UTC (**`$date -u`**). If not, use the handheld GPS to find the correct UTC time (mm is month, dd is day, hh is hour, nn is min) then:

```
Log in as superuser: $su
Password is 'xxxxxxxx' (8 lower case x's)
$date -u mmddhhnn2008
$set clock
$exit
```

10. Scrub the data and ingest directories of previous data (insure that the old data has been backed up to the Nav computer, or your laptop first):

```
$cd /usr/iris_data/ingest
$rm *.*
$cd /usr/iris_data/product_raw
$rm *.*
```

11. If the SMART-R has not been moved and the heading, latitude/longitude, and cab sector cut-out (transmitter blanking) angles were previously entered then proceed with Step 12 and skip the instructions in the yellow box below.

**To set the heading, latitude/longitude, and cab sector cut-out angles:**

1. Type "**$antx -int.** If the prompt doesn't change to: `RCP >,` Hit the ESC key
2. b. Type "RCP> **axis az**"
3. Hit return until the question about "Input offset from actual"
4. Enter the truck heading "hd" (obtained from handheld GPS) as:

If heading angle: hd < 180.0 : Input offset angle = -hd
hd > 180.0: Input offset angle = 360 – hd
hd = 180.0 : Input offset angle = hd

5. Scroll out of the axis az section by C/Rs. Enter "RCP> Save"
6. Type cntl-c to exit antx.
7. Type "**$dspx** If the prompt doesn't change to: `RVP >,` Hit the ESC key
8. Type "R
9. VP> **mt**"
10. Scroll down to the question "blank output triggers within AZ and EL sectors". Type "yes hd-17 hd+17. (e.g., if hd is 107 then type "yes 90 124")
11. Scroll out of the mt section by C/Rs. Enter "RVP> **save**"
12. Type **cntl-c** to exit dspx
13. Enter lat, lon, altitude by typring "**$setup**"
14. click on "RCP" button in the GUI window that appears, enter the lat, long, & alt from the handheld GPS unit
15. "Save" from the File menu
16. "Exit" from the File menu
17. Reboot the SIGMET computer by typing "**$reboot**" (*IMPORTANT*!)

12. Start the antenna GUI: **$antenna**
    - click the AZ and EL "stop" buttons
    - Unlatch the big red antenna stop button on front panel of antenna controller box.

- Click “Servo Power” if it isn’t already on.
- Click “Reset”
- Quit antenna GUI

13. Start “Big Iris”: **$siris &**
14. Minimize the two big iris windows.

## LEVEL THE TRUCK

1. Log on to the Nav computer using the wireless keyboard to Windows 2000: *User Name*: Administrator *Password*: smartr. NOTE: MAKE SURE THE “NUM LOCK” KEY IS NOT ENGAGED!!! (it has a tendency to come up engaged sometimes).
2. Activate the leveling program on the Nav computer.
3. With truck engine idle, turn on the PTO and Panel power switches located on the hydraulic control panel. Extend outwards the rear outriggers and lower all four leveling feet to within a few inches of the ground.
4. Place the metal plates beneath each leveler feet.
5. Raise and lower the various leveling feet to get the truck as level as possible using the leveler GUI.

## RADAR DATA ACQUISITION

1. Start “Little Iris”: **`$iris &`**
2. From the iris menu “*Menus*” click on “*Radar Status*”. Verify that the TASK Sched is “**debris**”, the Product Sched is “**debris**” and the Output Sched is “**DEFAULT**”.
3. File menu: “*Close*”
4. Bring up the Task Scheduler: “*Menus: “TASK Scheduler*”.
5. Right click on VCP-12 line at the word “Idle” and select “GO (SCHEDULE)”. The antenna should start scanning when the clock hits a 5-minute mark.
6. Bring up the real-time display from the iris menu “*Menus*: *Real Time Display*”. It’s the bottom item in the list. You should see the sweep line going around and the reflectivity echoes (if any) on the display. Note that the VCP-12 config has ground clutter suppression turned on, so don’t be surprised not to see any ground return when the field displayed is “DBZ”. Other fields that can be displayed by clicking on the button next to the field name: DBT – *Raw Rreflectivity (i.e., no clutter canceller)*; V – *Radial velocity*; W – *Spectral Width*.
7. After a volume scan or two completes, verify that the products are being written to disk by bringing the LINUX window to the front and typing:

```
$cd /usr/iris_data/product_raw
$ls
The directory list should grow with each completed volume
scan. The date/time is encoded in the file name, (e.g.,
SR1060114173000, which is SR1yymmddhhnnss)
```

## SHUTDOWN

1. Idle all TASKS in the TASK SCHEDULER MENU by issuing a STOP WHEN DONE to each task. Once all tasks in the task scheduler are idle. close the TASK SCHEDULER and STOP THE RADAR PROCESS from the RADAR STATUS MENU. Exit the rea1-time Display, if up, and EXIT Iris.
2. Archive all acquired data to the Nav computer or to your laptop
3. Quit IRIS by typing at the Linux prompt in the terminal window: **$qiris**
4. When prompted: `Proceed with stopping? YES`
5. At the Linux prompt **$antenna**
6. Using the antenna gui, position the antenna at the rough stow position: Move the azimuth to point the antenna roughly directly off the back of the truck (hd + 180.0, mod 360). Move the elevation to 54.0 degrees
7. Exit the antenna gui
8. At the Linux prompt: **$qant**
9. Actuate the EMERGENCY PEDESTAL SHUTDOWN switch
10. Turn the transmitter OFF from the transmitter control panel.
11. Turn off the power on the antenna control interface panel
12. Shutdown the SIGMET computer: $**shutdown -h now**
13. Shutdown the Nav computer from the windows menu at the bottom right
14. Power down the UPS with the small button
15. Switch off the 4 breakers behind the chair, breakers should point out or away from each other.
16. Turn off the diesel generator and lock the 3 SR1 doors and the generator compartment

# MOTOSAT OPERATING INSTRUCTIONS

The MotoSat equipment is located below the table on the right hand side of the operators rank in the cab rear behind the plexiglass plate. There are two components, the Antenna System and the Modem. To activate the MotoSat system first pull down the plexiglass plate and::

1. Push the Power on button on the lower box labeled “MotoSat”

2. Push the “Search” button

The system should activate the antenna to begin searching for a satellite. It can take up to 15 minutes to lock on to a satellite during which time the antenna searches the sky. When the system indicates a lock you can then go to any web page.

You can monitor the system performance by activating a web browser on the Nav computer (or any laptop attached to the SR1 network) and going to the URL: **http://192.168.0.250**

To stow the antenna click on the “Stow” button on the web page or push the “Stow” button on the MotoSat unit.

# "WDSSIIF" OPERATING INSTRUCTIONS

The "*wdssiif*" LINUX computer (on the floor of the rear cab) creates and transmits images of the base scan reflectivity to a web site at OU. After the SIGMET machine has booted AND the MotoSat system has locked on to satellite boot the wdssiif computer *last*:

Power up the wdssiif computer with the button on the front panel.
Switch the Nav computer display to wdssiif by selecting it on the OmniPort selector
Log onto wdssiif as root: User: **root** Password: **~Terrod7**
Set the clock to match the SIGMET computer by **$date mmddhhnnyyyy**
Mount the SIGMET product directory: **$mount /iris_data/product_raw** (it may take a minute or two to complete the mount)
Log out as root: **$exit**
Log in as User: **hmt** Password: **n2l,rulZ**
Start the X-window system: **$startx**
Start four (4) x-windows by right clicking on the background and selecting "xterm" from the menu. Move all the windows to the right hand side of the monitor to leave room for the visky window.
In the first terminal window, start the process that transfers files from the SIGMET to the wdssiif computer:

**$sigmet_to_wdssiif**
The volumes should show up in $HOME/product_raw as they are created

In the 2nd terminal window, start the process that generates base-scan imagery:

**$sigmet_imgs**

As volumes arrive the images will appear in $HOME/img and the visky widow should appear in the upper tight hand corner of the monitor and display the various elevation angle scans as they is received by *wdssiif*. The tilt levels to be saved and uploaded are enclosed in the quotes.
Be careful not to obscure the *visky* display. Images are created as screen dumps and any portion of a window on top of *visky* will be included in the screen dump.

In the 3rd terminal window start the process that transfers images from *wdssiif* to *smartr.metr.ou.edu*:

```
$ssh-agent /bin/bash
$ssh-add ~/.ssh/id_dsa
$wdssiif_to_www
```

In the lower-right terminal window update the web site on smartr.metr.ou.edu:

Log into smartr: **$ssh hmt@smartr.metr.ou.edu** (password: **n2l,rulZ**)
Run: **$update_loops.sh**
Loops should appear in URL: *HYPERLINK "http://smartr.metr.ou.edu/~hmt"http://smartr.metr.ou.edu/~hmt*

# DATA ARCHIVAL FROM WDSSIIF

These instructions assume the user has a Mac laptop and will archive the data files on that hard disc and that wdssiif has been running and transferring the data files to its hard disc (/iris_data/product_raw)

Hook the Mac laptop internet to the white internet cable coming out of the back of the rear-cab rack. Assign the IP of the laptop using DHCP.
Start X11 or the terminal program.
Create a folder on the desktop and name it something recognizable (e.g., DF_071207_IOP1).
Make the working directory that folder:

```
$mkdir ~/Desktop/DF_071207_IOP1
$cd DF_071207_IOP1
$sftp  HYPERLINK "mailto:hmt@192.168.0.5" hmt@192.168.0.5
cd product_raw
mget SR107120710*   ! gets all raw files after 10 UTC on 12/07
```

**$quit**

**SR1 Network Addresses**

| *Machine* | *IP* | *User* |
|---|---|---|
| SIGMET SR1 | 192.168.76.90 | root |
| SIGMET SR1 | 192.168.76.90 | operator |
| wdssiif | 192.168.0.5 & 192.168.76.91 | Root |
| wdssiif | 192.168.0.5 & 192.168.76.91 | hmt |
| smartr.metr.ou.edu | | hmt |
| Nav | | Administrator |
| Mac Laptop | 192.168.0.4 or DHCP assigned | |
| MotoSat | 192.168.0.255 | |

There are two networks in SR1: the MotoSat network and the SIGMET network. Normally the SIGMET network is hidden and protected from all logins by *wdssiif*. Plugging a laptop into the spare internet cable will enable the laptop to only see the MotoSat network (IP assigned by DHCP). If you need to remotely log on to the SIGMET machine you first need to log into *wdssiif* and then log into the SIGMET machine.

# Other useful LINUX procedures

*To export a file system:*

On the machine that has the disc log in as *root* and edit /etc/exports to add a line:

Directory_to_Share IP(rw) e.g., /iris_data/product_raw 192.168.0.4(rw)

**$service nfs start** ! starts network services if its off
**$exportfs –av** ! re-reads the /etc/exports file
On the other machine:

$sudo mount –o –P IP:dir mount_point
e.g., $sudo mount –o –P 192.168.0.5:/iris_data/products_raw

*To log into the SIGMET machine from the mac:*

$ssh –X hmt@192.168.0.5 ! log into the *wdssiif* machine
On *wdssiif*: $ssh –X operator@192.168.76.90 log into the SIGMET machine (this is necessary because wdssiif acts like a firewall protecting the SIGMET machine from intruders. *wdssiif* has two IP addresses (192.168.0.5 & 192.168.76.90, one for each network)

*To log on or scp from/to a machine without asking for a password:*

Generate keys. On the machine you'll be ssh from:

$cd $HOME/.ssh
$ssh-keygen -t rsa {generate id_rsa.pub and id_rsa; enter "return" for no passphrase)

Copy the id_rsa.pub file to the target machine:

$scp id_rsa.pub hmt@wdssiif:.ssh/authorized_keys.new

log onto wdssiif

$cd .ssh
$cat authorized_keys authorized_keys.new > authorized_keys (append authorized_keys.new to authorized_keys)

You should now be able to ssh into wdssiif without asking for a password

## Quick dbz to rainfall rate (mm/hr) conversion using $Z=300R^{1.4}$ and $Z=200R^{1.6}$

| dBZ | $Z=300R^{1.4}$ mm/hr | $Z=300R^{1.4}$ in/hr | $Z=200R^{1.60}$ mm/hr | $Z=200R^{1.60}$ in/hr |
|---|---|---|---|---|
| 10.0 | 0.1 | 0.00 | 0.2 | 0.01 |
| 15.0 | 0.2 | 0.01 | 0.3 | 0.01 |
| 20.0 | 0.5 | 0.02 | 0.6 | 0.03 |
| 21.0 | 0.5 | 0.02 | 0.7 | 0.03 |
| 22.0 | 0.6 | 0.02 | 0.9 | 0.03 |
| 23.0 | 0.7 | 0.03 | 1.0 | 0.04 |
| 24.0 | 0.9 | 0.03 | 1.2 | 0.05 |
| 25.0 | 1.0 | 0.04 | 1.3 | 0.05 |
| 26.0 | 1.2 | 0.05 | 1.5 | 0.06 |
| 27.0 | 1.4 | 0.06 | 1.8 | 0.07 |
| 28.0 | 1.7 | 0.07 | 2.1 | 0.08 |
| 29.0 | 2.0 | 0.08 | 2.4 | 0.09 |
| 30.0 | 2.4 | 0.09 | 2.7 | 0.11 |
| 31.0 | 2.8 | 0.11 | 3.2 | 0.12 |
| 32.0 | 3.3 | 0.13 | 3.6 | 0.14 |
| 33.0 | 3.9 | 0.15 | 4.2 | 0.17 |
| 34.0 | 4.6 | 0.18 | 4.9 | 0.19 |
| 35.0 | 5.4 | 0.21 | 5.6 | 0.22 |
| 36.0 | 6.3 | 0.25 | 6.5 | 0.26 |
| 37.0 | 7.5 | 0.29 | 7.5 | 0.29 |
| 38.0 | 8.8 | 0.35 | 8.6 | 0.34 |
| 39.0 | 10.4 | 0.41 | 10.0 | 0.39 |
| 40.0 | 12.2 | 0.48 | 11.5 | 0.45 |
| 41.0 | 14.4 | 0.57 | 13.3 | 0.52 |
| 42.0 | 17.0 | 0.67 | 15.4 | 0.61 |
| 43.0 | 20.0 | 0.79 | 17.8 | 0.70 |
| 44.0 | 23.6 | 0.93 | 20.5 | 0.81 |
| 45.0 | 27.9 | 1.10 | 23.7 | 0.93 |
| 46.0 | 32.8 | 1.29 | 27.3 | 1.08 |
| 47.0 | 38.7 | 1.52 | 31.6 | 1.24 |
| 48.0 | 45.6 | 1.80 | 36.5 | 1.44 |
| 49.0 | 53.8 | 2.12 | 42.1 | 1.66 |
| 50.0 | 63.4 | 2.50 | 48.6 | 1.91 |
| 51.0 | 74.7 | 2.94 | 56.2 | 2.21 |
| 52.0 | 88.1 | 3.47 | 64.8 | 2.55 |
| 53.0 | 103.8 | 4.09 | 74.9 | 2.95 |
| 54.0 | 122.4 | 4.82 | 86.5 | 3.40 |
| 55.0 | 144.3 | 5.68 | 99.9 | 3.93 |
| 56.0 | 170.1 | 6.70 | 115.3 | 4.54 |
| 57.0 | 200.5 | 7.89 | 133.2 | 5.24 |
| 58.0 | 236.3 | 9.30 | 153.8 | 6.05 |
| 59.0 | 278.6 | 10.97 | 177.6 | 6.99 |
| 60.0 | 328.4 | 12.93 | 205.0 | 8.07 |

# *Debris Task Configuration Set Up*

These are the radar task configuration set up parameters. Right click on the "***VCP-12***" task and select "Edit" to bring up the task config editor.

14 Elevation Steps that mimic the VCP-12 volume scan: 0.5°, 0.9°, 1.3°, 1.8°, 2.4°, 3.1°, 4.0°, 5.1°, 6.4°, 8.0°, 10.0°, 12.5°, 15.6°, 19.5°

Scan Speed: Auto (put in a 0)

Data: Z T V W SQI

Samples: 64

Filter Dop: 3 (gets rid of ground clutter by a notch $V_r$ filter around 0 m/s).

Bin Spacing: 125 m

Bin Average: 1

Max Range: 111.0 km

Input, Output bins: 889, 889

High, Low PRF: 1350, 1350

Processing: FFT

Vel Unfold: OFF, No Data Corrections

Data Quality Thresholds:

| | | |
|---|---|---|
| T | Log | LOG 1.38 |
| Z | SQI+Log+CSR | SIG 5 |
| V | SQI+CSR | CSR 10 |
| W | SIG+SQI+LOG | SQI 0.35 |

Speckle ON for Z & V

The HMT-VCP12 task should take ~4 min 30 seconds to complete. The repeat time is set for 5 minutes

The Task Configuration window for VCP-12 should look like this:

# Contact List

| Name | Organization | Role | Cell Phone | Office Phone | email |
|---|---|---|---|---|---|
| David Jorgensen | NSSL | Scientist/Radar Oper. | (405) 850-5871 | (405) 325-6270 | David.P.Jorgensen@noaa.gov |
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| Steve Vasiloff | NSSL | Scientist/Radar Oper | (405) 205-7289 | (405) 325-6480 | Steven.Vasiloff@noaa.gov |
| Kevin Scharfenberg | NSSL | Scientist/Radar Oper | (405) 818-6367 | (405) 325-6387 | Kevin.Scharfenberg@noaa.gov |
| Kevin Manross | NSSL | Scientist/Radar Oper | (405) 255-0537 | (405) 325-6385 | kevin.manross@noaa.gov |
| J. J. Gourley | NSSL | Scientist/Radar Oper | (405) 831-2168 | (405) 325-6472 | Jj.Gourley@noaa.gov |
| Les Showell | NSSL | Driver/Radar Operator | (405) 550-0270 | (405) 737-3281 (home) | Les.Showell@noaa.gov |
| | | | | | |
| | | | | | |
| Mike Biggerstaff | OU | SMART-R Chief | (405) 623-1769 | | drdoppler@ou.edu |
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